1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans



# MATERIAL CULTURE

## HOUSES

### House Styles

341 797 343 A wide variety of house styles is found in Pukapuka today. In the permanent villages, the dwelling houses are either of coral lime roofed with pandanus thatch, or of a type introduced from Rarotonga by the missionaries, with slat walls reaching to the roof and often with a wide veranda. Along with these modern houses are found old style dwelling houses and cook houses. Small, square, slat-walled houses which stand close to each dwelling house in the permanent villages were evidently orginally built under missionary impetus to serve as bath houses. Some of these bath houses are used for their assumed purpose, but the majority, after their novelty wore off, were converted into storehouses for fishing gear. Loto village at one time set up a row of wooden structures on coral lime foundations in the water a few feet from the lagoon beach. These serve as privies; many of them are in sad need of repair.

In the copra villages, most dwelling and cook houses are built in an old Pukapukan style. One house in particular, a watch house at the place Matala in Uta, has acquired undue prominence in the literature because of its age. Built about three generations ago at the time of first missionary contact, it is a well-authenticated example of one style of Pukapukan house building.

#### SIMPLE RIDGEPOST HOUSE

341 335 The *wale tolualu* (fig.8,a) is a small, low house, usually erected on exposed outer beaches to serve as a cook house, sometimes as a sleep house. The framework consists of two ridgeposts (*pou tu*), which support a single ridgepole (*tau matua*). In one subtype, rafters (*waiti poto*) run from the ridgepole to the ground. In the other subtype, two wall posts (*pou*) on each side support wall plates (*kaukau matua*). Rafters run down from the ridgepole to rest on the wall plates. There are no thatch rafters; the thatch of coconut roof sheets is laid directly against the rafters, in such a manner that the midrib bases of the roof sheets function as thatch purlins. Lashings are of sennit or, as in a rough house examined, of dried *pulaka* stalks. Smaller houses of this type have one ridgepole only, but more substantial houses have a second ridgepole (*tau lua*), which is laid in the crossings of the rafters (fig.8,a). The ridgepole roof sheet is securely fastened to the framework by pegs (*yuki*) that are pushed through the sheets and between the two ridgepoles.

A roof extension (*taumata*) is often added to the exposed end of these

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houses. Two cook houses of the *toimaha* type each with a roof extension were observed on the outer beach of Uta:

Two wall posts on each side support a wall plate. Two grooved ridgeposts support the ridgepole. Nine rafters run from the ridgepole to the wall plate on each side of the house. Coconut roof sheets are laid directly on these rafters. The northeast, southeast, and southwest sides of these houses are open, the ends of the rafters on these sides being about 3 feet from the ground. At the northwest end of the houses, two low end posts, each about 18 inches high, support an end plate. End rafters run from the side rafters to these end plates. The thatching of the extension is continued to the ground by extra wide roof sheets that hang down from the end plate. This extension provides complete shelter against severe winds from the northwest. It also acts as a shelter for the ground oven and as a storage place for dry coconut shells and firewood.

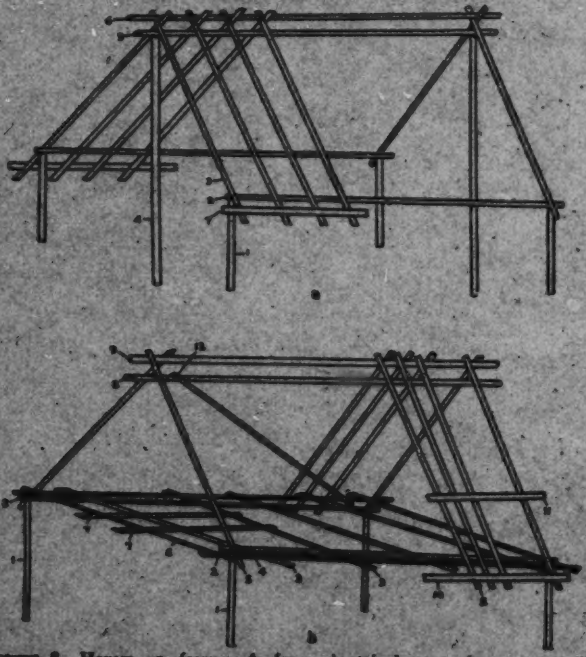

FIGURE 8.—Houses. *a*, framework for *male toimaha* type house: 1, wall post (*pou*); 2, wall plate (*haukau matua*); 3, rafter (*uuti poto*); 4, ridgepost (*pou ai*); 5, ridgepole (*tau matua*); 6, thatch ridgepole (*tau lua*); 7, purlin (*tabilibili*). *b*, framework for *wakeyamoa* type house: 1, wall post; 2, wall plate; 3, tiebeam (*oka*); 4, roof plate (*haukau lua*); 5, rafter; 6, end purlin (end rafters not shown), braced by two supports (*yoka*); 8, main ridgepole; 9, thatch ridgepole; 10, side eaves purlin; 11, midway purlin (*talaua*); 12, diagonal brace (*yoka*), running from roof plate to main ridgepole.

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TIEBEAM HOUSE

The tiebeam house with paired side supporting posts, wall and roof plates is termed *wale uakoyamoa* (fig.8,*b*). Though similar to the Rakahangan and Samoan tiebeam houses (29, pp. 70-75; 27, pp. 15 ff.), the Pukapukan house customarily has no kingpost, its principal rafters cross below the ridgepole, and there is no set of wall posts other than the main series of paired wall posts which support the wall plates, tiebeams, and roof plates. For this reason I have retained the term "wall plate" for the longitudinal beam that rests on the wall posts, but this wall plate functions in the same manner as the tiebeam plate of the Samoan house. It is likely that the Pukapukan name for the type house, *wale wakoyamoa*, is derived from its similarities to the Samoan house of this style.

This house type is used for dwelling and cook houses in both village and copra settlements. When the tiebeams are covered with a platform (*papanga*), on which coconuts at the *takataka* stage are stored, the house is termed *wale takataka*, a name sometimes given as the type name of the house. The *wale uakoyamoa* is also constructed in the reserves as a watch house for the guards. On the outskirts of the villages rough structures of this type are used as shelters for disassembled canoe sections.

In the typical house of this style, two wall posts on either side, grooved at the upper end, support wall plates which rest unlashed in the grooves. Four tiebeams (*oka*) rest on these wall plates and project 18 inches beyond the wall plates to which they are lashed. Resting against the outer ends of each tiebeam are thin poles which serve as supports for the coconut-leaf wall sheets (*takapau*). Roof plates (*koukou lua*) are placed longitudinally on top of, and at the outer extremities of, the tiebeams. Twelve rafters (*uuti pote*) run from roof plate to ridgepole on either side of the house. They are lashed to both roof plate and ridgepole and cross above the ridgepole to support the thatch ridgepole (*tau lua*). An eaves purlin (*tahilihili*) and a second purlin (*talava*) midway between roof plate and ridgepole are lashed to the inside of the rafters on each side of the house. The roof plate seems to function here as a third purlin, and some informants gave *talava* as the name for both purlin and roof plate. On the two outer tiebeams at each end of the house are lashed, longitudinally, thin split sections of pandanus wood. These form end platforms for the storage of mats and household goods. They project beyond the outer tiebeam at each end to support an end purlin (*talava tafa lava*). The end rafters are lashed to this purlin and to an end eaves purlin. On one side of the roof framework, a diagonal strut (*yoka*) runs on the inside of the rafters from the ridgepole at the point where the first rafter joins the ridgepole, down to the roof plate at the point where the tenth rafter joins the roof plate. The strut is lashed to ridgepole, intermediate rafters, and roof plate. On the opposite side of the house, the strut runs from the ridgepole at the tenth rafter to the roof plate at the first rafter. In other houses of the *wakoyamoa* type, two braces are used on each side. The braces run diagonally from the roof plate in the center upward to each end of the ridgepole. The type house has no other ridgepole support than rafters and struts, but in one house observed, a rough kingpost ran from the second tiebeam in from the end and supported a ridgepole. The kingpost, also called *yoka*, was of rough wood, undressed, and obviously a novel addition to the roof framework. It was lashed neither to tiebeam nor ridgepole.

Each gable end of the type house is made by running eight end rafters (*uuti pote*

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*tuki kowa*) from the end curves purlin (which is itself lashed at each end to the side curves purlins) to the end side rafters. Four end rafters run to the left side rafter, four to the right side rafter. The end rafters are of varying length depending on their distance from the highest point of the ridgepole. Another end purlin, midway between eaves purlin and ridgepole supports the end rafters on the inside. A variation may sometimes be introduced into the gable end of both the *waharumoa* and the *waka atua* house types, by using for the end purlin a piece of timber that has a slight, natural curve in the horizontal plane. The end rafters would be made of suitable length to retain the natural curve of the purlin. In small houses of the *waharumoa* type, where the end purlin was of small diameter, it was sometimes bent into an artificial curve through binding the two ends of the purlin to the ends of the two outermost side principal rafters and through graduating the length of the end rafters in such a way that when lashed to the purlin, they thrust it out in a slight horizontal curve. There are no side or end thatch rafters on the type house. The coconut roof sheets are fastened directly to the principal rafters, the midribs of the sheets functioning as thatch rafters.

## Lashing

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The lashing used for all parts of the house framework is of one pattern only, that of alternating curves, termed *yinna tuhaviavi*. The lashing corresponds to the curved pattern lashing described by Buck (29, p. 72, fig. 5)

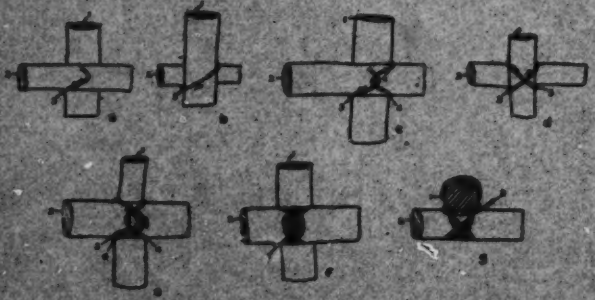

FIGURE 9.—Alternating curves lashing, used for principal parts of house framework; lashing shown for fastening together tiebeam (1) and wall plate (2). *a*, view from above: sennit braid laid on wall plate and held with thumb; free end makes curved turn on under side of wall plate (3). *b*, view from below: free end makes transverse turn across tiebeam. *c*, view from above: sennit braid (4) brought across commencement end, thumb holds crossing cords in place while braid makes curved turn across and down at wall plate (4). *d*, view from below: braid (5) makes transverse turn across and up tiebeam to curve around wall plate. *e*, view from above: braid (6) curves to right across second curve (4) and locks preceding two curves in place; thumb then removed and rough sennit does not slip. *f*, view from above: repetition of two curved turns successively applied on outer side of previous turns produces pattern (7); number of lashings varies according to elements, average number being 5 curves on either side, 10 in all. *g*, side view: crossings of turns and half of one design; braid (2) makes a number of horizontal circumferential turns around lashing turns between two wooden elements; end of braid fixed by half hitches around last loops. (Diagram adapted from Buck, 29, fig. 5, p. 72.)

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for a type Rakahangan house, save that the Pukapukan commencement differs slightly from the Rakahangan technique. The Pukapukan lashing is shown in figure 9. This lashing is extremely common in Pukapuka on both houses and canoes, and is the only lashing used when it is necessary to fasten together securely two crossing elements.

## Thatching

All houses in former days were thatched (*ato*) with coconut roof sheets (*pola kaumio*). The method of plaiting the double coconut sheet is that described by Buck (26, pp. 7-11, figs. 6-10) for Aitutaki. Before being made into roof sheets the coconut leaf midribs are soaked in salt water for a few hours to free them of insects. The roof sheets are attached to the rafters by a continuous two-ply twisted sennit cord (*uho*); the method of passing the cord through the sheets from the inside of the house and back from the outside is that described for Aitutaki (26, pp. 19-21, figs. 23-25). A special thatching needle (*yuki*) is used in Pukapuka, however, to facilitate this work. Two methods are distinguished by which the sheets may be applied to the rafters:

In one method (*ato yiuki lau*), the sheet midribs are all of the same length. They are applied in courses running from eaves to ridgepole, the midribs about one inch apart, contiguous courses overlapping. In the second method (*ato tele*) some roof sheets are made with short, some with long, midribs. Long midribs (*ai pola*) alternate in each course with short midribs (*pu pola*) and the sections running from eaves to ridgepole are not defined as in the *ato yiuki lau* method. The *ato tele* method of applying the sheets is more laborious than the *ato yiuki* method, but a well-thatched roof of this type is more apply waterproof and lasts up to 10 years, whereas an *ato yiuki* roof, though more easily and quickly applied, rarely lasts longer than four to five years.

In thatching a roof section, a long doubled sheet (*pola tumutu*) is placed on the rafters above the eaves. A long sheet is placed on top of this and the lashing to the rafters commences. Short sheets alternate with long sheets. As the thatching advances up the side of the roof, a worker lifts up the roof sheets to those who are lashing from the inside by skewering them with a lifting pole (*take pola*), which has the customary shoulder point. In both methods of thatching it is arranged that the last sheet to be applied to the sides is a long one. On top of this and overlapping the ridgepole break (*ati*) between the thatchings of the two sides is placed another sheet (*pola ati*), covered by still another sheet (*pola taupato*). Over all is placed a coconut ridging mat (*tahitau taupato*), made of two split half leaves and one whole leaf as described for Aitutaki (26, pp. 24-28, figs. 28-34). The gable ends are thatched in the same manner, starting from the double sheet at the eaves and working up to the ridgepole. The sheets are shortened as the thatching comes close to the ridgepole. At the top a small space is usually left for ventilation, and at the sides the edges of end sheets are often wedged in between the sheets that form the side thatching. Some leave the overhanging sheets at the eaves ragged and irregular, but others carefully trim the eaves edge of the sheets in an even line (*hotihoti te tafatahi uaie*).

When heavy winds are expected, the thatching of coconut-leaf sheets is reenforced by knotting together the tip ends of two coconut midribs, which are then slung over the roof thatching in such a way that one midrib falls

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on one side of the roof, the other midrib on the other side. Where the roof is low, leaflets at the butt end of each midrib are carried under the eaves and tied to a thatch rafter. Where the roof is high, the weight of the midribs is sufficient to hold down the roof securely. A number of these double midrib slings are placed at intervals along the roof for added protection.

House thatching with pandanus leaves was introduced into Pukapuka by missionaries from Rarotonga. The method in use conforms in every particular to the Aitutaki method (26, pp. 11-24):

> Pandanus leaves are collected in the reserves, and straightened (*uwe kaunuku* or *pupuke kaunuku*) by passing them around an upright stick (*lakau uwe kaunuku*). The leaves are then fastened in bundles (*tohai kaunuku*) by placing the tip end of each leaf over the butt end and tying the ends of a number of leaves together. The leaves are bent over and sewn to strips of wood split from the aerial roots of the pandanus. A sewing needle (*tui*) is used to split the longitudinal grain of the pandanus leaves so that the coconut leaf midribs (*tuaniu*) may be inserted to keep the leaves in position on the wooden strip. The completed roof sheet is termed *pola kaunuku*.

## Framework Construction

Pandanus wood is used almost exclusively in the framework of the *wakayumoa* type house. Formerly the wall posts were buried about 12 inches in the ground, but in a modern house of this type, four ground posts are supported on low, grooved coral stones and the wall posts are fitted to these ground posts by mortise and tenon joints. In the modern house the tendency is also to fit together tiebeams, wall and roof plates with mortise and tenon joints, but in the old house this would have required much labor with shell adzes. Hence only the tops of the wall posts were grooved (*wakaulu pou*) to receive the wall plates, the heads of the rafters chipped out (*wakatala*) to fit against the ridgepole, and roof plates grooved (*wakahawa*) to fit against the tiebeams. If it is necessary to leave a house framework unthatched for several days all the principal posts are wrapped with coconut-leaf mats (*takapau*), and rafters are covered with a few coconut midribs, to protect the timbers from rotting or warping in sun or rain.

## Wall Mats

In old houses of the *wakayumoa* type, walls are made with coconut-leaf mats (*takapau*). Mats are made long enough to overlap two wall poles, the depth of plaiting for each mat being about 12 inches. In a typical house, four mats form a set between each pair of wall poles. The mats are supported at their upper, midrib edges by two or three sennit cords spaced equidistantly between the two edges. The method of support is the same as the Samoan method (27, pp. 73-74, fig. 79). The mats operate on a Vene-

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341 tion blind system and are raised and lowered according to the direction of
283 the prevailing wind. The overlap of the mat screens against the wall poles
284 prevents their being blown inward by the wind.

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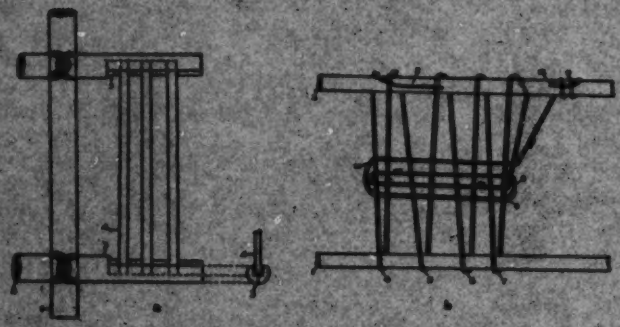

FIGURE 10.—Details of house construction. *a*, making of house wall (*uatasi*): 1, wall post; 2, horizontal wall logs; 3, point at which slotting of inner surfaces of wall logs commences; 4, thin rails fitting at each end into slotted wall logs. *b*, suspended loop lashing (*ginea tuakawau*), bracing first and second ridgepoles (*tau matua, tau lua*), also bracing third and fourth ridgepoles (*tautolo* and *tau momoli*) in model *tuaki atua* house: 1, main ridgepole; 2, second ridgepole; 3, buried commencement end of sennit braid laid on ridgepole; four figure-of-eight turns (4, 5, 6, 7) made around both ridgepoles; free end (8) passes in one circumferential turn round four figure-of-eight turns; free end then passes (9) through lower loop of figure-of-eight and back through upper loop (10); lashing finishes with overhand knot made on one cord of outer loop or else free end passes up to second ridgepole where it makes two or more turns (11) and finishes buried underneath two turns (12) and pulled tight.

## Wooden Walls

341 Low walls (*uatasi*) are sometimes added to dwelling and cook houses
335 of the *tuhayamoa* type by the following method, said to be old:

Two *pandanus* logs about 6 inches in diameter are run between the wall posts, one log at ground level, the other about 30 inches from the ground. A rough slot is hollowed out about 3 inches deep and 2 inches wide on the inner surfaces of the two logs. A series of *kaupou* poles, about 3 feet long and 1½ inches in diameter, is inserted vertically between the two logs, the upper and lower end of each pole resting in the slots. This wall, which resembles a close-set railing fence (fig. 10*a*), encloses the house on three sides, leaving one end open for a door. On the outside of this low wall and between the top of the wall and the roof eaves (if the eaves are high), *tuhi* mats are hung for extra protection. Cook houses rarely add the extra mat protection unless they are in exposed situations. The method of adding a wall to a house by inserting horizontal slats between uprights and tying the slats together by a continuous cord of sennit is modern and introduced from Rarotonga.

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## House Platform

Most dwelling houses and a few cook houses are built on a platform of coral rubble (*paepae*), several feet larger than the ground area of the house. The rubble is contained by a curbing of coral stones 8 to 10 inches high. Some houses are built on a secondary or upper platform of rubble limited by a coral or log curbing, which forms the house floor and extends about 12 inches beyond the walls of the house. Most houses in the copra settlements are built on a single low platform, gravel inside the house being retained by log curbings.

## Variations on Type House

Variations on the type house are found in the copra settlements.

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One house on the back beach of Uta conforms in all particulars to the *uakeyamoa* style, save that the ridgepole is supported by two ridgeposts, which stand on the lanai side of the end tiebeams. This house combines features from the *uakeyamoa* type and the *uale atua* type. Most houses on exposed beaches are permanently covered on three sides with *takapau* mats or *pola* roof sheets fastened to wall poles. Only the leeward side of the house is left open between the ground and low eaves. In exposed situations, cook houses and dwelling houses of the *uakeyamoa* type are provided with roof extensions (*taumata*) to cover ovens or to provide a roomy wind break. The rafters on the exposed side of the house are extended to about 18 inches or 2 feet from the ground and supported on subsidiary wall posts and a subsidiary wall plate. The extension is thatched, and permanent *takapau* mats are fastened to the outside of the subsidiary wall posts.

A small typical *uakeyamoa* house, used as a sleep house in Yato village, measured 15 feet 8 inches long, 11 feet 7 inches wide; the eaves were 4 feet 6 inches from the ground; and the ridgepole was 9 feet 7 inches from the ground.

## Storage Houses

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Houses of the *uakeyamoa* type used as storage houses (*uale takataka*) for nuts, fishing gear, or old canoe sections are often built far enough from the village to be safe from fire, but near enough to be easily visited. The floor of a *uale takataka* is used either as a place for lumber storage, or as a workshop for craft activities. According to the number of nut trees a man owns and the number of nuts he has to store, he possesses one or more *uale takataka*. Four houses was the usual number for an average family in former times, before copra was made.

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## Storage Platform

Nuts at the *takataka* stage are stored on a platform laid on the tiebeams and occupying the whole area marked out by the tiebeams. The lengths of wood forming the platform and the rafters are laid very close together to prevent the intrusion of thieves. Legitimate entry to the platform is made through one or two gates or hatch-

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343 284 ways built into the center of the platform. Formerly the bottom hatch (*fa lau*) was level with the platform and lashed to it by complicated knots supposed to be known only to the owner of the house. When in use, the fastenings were untied and the hatch placed on the ground. The top hatch (*fa tai*), about 12 inches directly over the first hatch, was lashed horizontally to the top ends of thin vertical poles, which were lashed at the bottom to the platform supports. The two hatches and the vertical supporting poles thus formed a sort of box resting on the platform. On visiting his *wale takataka*, the owner took with him a block of wood which he placed on the ground under the hatch. He mounted this block to unfasten the first hatch, inside of which he usually kept a length of rope. One end of this he fastened to the platform and then, by the help of the hanging rope, scrambled up to open the second hatch. On leaving, he securely fastened the hatches, retied the knots, placed his piece of rope on the platform, and carried off his block of wood. After white contact a short ladder, something like a truncated grocer's ladder, came into general use to reach the platform hatches. This was called *tala*, a name probably derived from the word "scale". It was kept in the owner's sleep house when not otherwise needed. I saw no *wale takataka* house with two hatches in the storage platform. The above description is based on informant's account of old time practice. Many houses today, however, have the single hatch, which as often as not is fastened with hinges and padlock to the platform.

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### RIDGEPOLE, WALL PLATE HOUSE

341 344 53b The type *wale atua* house is a bilateral wall plate house with two or more ridgeposts supporting the ridgepole (fig. 11). The type house was used in former days principally as a god house (*wale atua*), but the massive construction style made the same type of house ideal for a meeting or watch house. Smaller houses of this type were occasionally used as sleep houses. There are available for study today the watch house at Matala, erected 75 years ago (described as type), a sleep house on the outer beach of Uta, and a model *wale atua* house (C8086)[1]. Brief mention of certain features of the framework of the watch house has already been made by Macgregor (20,p.43).

The watch house was originally constructed with six wall posts. A seventh post has been added at a later date to give added strength. The wall posts of *puapua* wood are sunk about an arm's length in the ground. Each post is round in cross section, save at the top where it is adzed roughly rectangular. The top of each post is grooved to receive the wall plates of pandanus wood, which are laid in the grooves, unlashed (fig.11). Five tiebeams are placed transversely across the wall plates, one tiebeam at each end, and the other three equi-spaced along the length of the house. The end of each tiebeam is grooved to fit securely over the wall plate to which it is lashed. The ends of the tiebeams are flush with the wall plates. Two ridgeposts of *puapua* wood, buried in the ground at one end and grooved at the other end, support the main ridgepole of pandanus wood which rests in the grooves and is unlashed. Each ridgepost rises from the ground on the inner side of the second tiebeam from each end; about 2 inches separate ridgepost and tiebeam. Running between wall plate and ridgepole on either side of the house are six principal rafters of pandanus wood. Each rafter is round in cross section but is grooved at each end to fit against ridgepole and wall plate, to which it is lashed. Each rafter at its lower end projects about 9 inches beyond the wall plate. The under surface at the end of the rafter is flattened that the square surface of the eave purlin may fit more closely to it before lashing (fig.11,*c*).

[1] Unless otherwise stated, all collection numbers refer to specimens in Bernice P. Bishop Museum.

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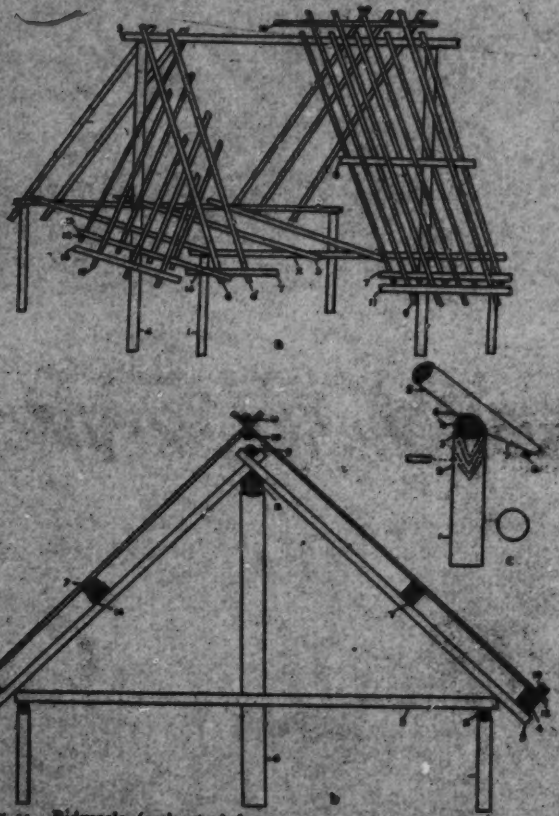

FIGURE 11.—Ridgepole (*uato ewau*) house. *a*, general features of frame construction: 1, wall post, supporting wall plate (2) on which rest tiebeams (3); ridgepost (4) passes upward on inner side of end tiebeam to support main ridgepole (5); principal rafters (6, 6') cross above ridgepole, and are lashed at lower end to wall plate and at upper end to ridgepole; eaves purlin (7) and midway purlin (8) lashed to principal rafters; thatch rafters (9) pass over purlins (7, 8) and support at top second ridgepole (10); another eaves purlin (11) lashed to lower end of thatch rafters; end principal rafters (12) pass to ridgepole and second side principal rafter (6') on each side of roof; end rafter eaves purlin (13) lies on bottom of end principal rafters, and is joined at side to side rafter eaves purlin (7) at point (14); end thatch rafters (15) pass over end purlin (13), and up to first side principal rafter (6) on each side; end eaves purlin (16) joins bottoms of end thatch rafters (15). *b*, end view: 1, wall post; 2, wall plate; 3, tiebeam; 4, rafter eaves purlin (*tahilihli*); 5, rafter; 6, ridgepost; 7, midway purlin, on left side widened by chock (*seinei*) (14); 8, main ridgepole; 9, second (rafter) ridgepole (*taulua*); 10, third (rafter) ridgepole (*tautolu*); 11, fourth ridgepole (*uato mamoli*); 12, thatch rafter (*hayo*); 13, thatch rafter eaves batten. *c*, detail of wall post and rafter: 1, wall post, round cross section, adzed at top to produce rectangular cross section 2; head of wall post grooved (*taahaalu pou*) (2) to receive wall plate (4); principal rafter (5) grooved on inner side (*taahaanu*) at 6 to fit over wall plate; inner side of rafter flattened (7) so that eaves purlin (8) will fit closely.

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On each side of the house 25 thatch rafters (*hoyá*) of *tuatua* wood are lashed to the eave and midway purlins. At the top, each pair of thatch rafters crosses above the ridgepole to support a thatch ridgepole to which each rafter is lashed. At the bottom, the thatch rafters are lashed to a thatch purlin which passes longitudinally on top of the series of rafters.

Each gable end is formed first by three principal end rafters of *nukunuku* wood which are lashed to the end tiebeam. The two outermost end rafters run between the end tiebeam and the two outermost side rafters, being lashed to these about two-thirds of the distance from the lower ends of the side rafters. The middle end rafter runs from the end tiebeam to the main ridgepole and is lashed to it at a point 3 feet from the end of the ridgepole and on the inside of the first two principal end rafters. To the bottom ends of these end rafters is lashed an end eaves purlin. The nine end thatch rafters are lashed at the lower end to an end eaves purlin, and at their upper end to the second side thatch rafters. Thus the gable ends of the house incline obliquely inward so that the main roof projects beyond the gable end for a distance of about 2½ feet.

The lashings of this house are of two kinds. The lashing of thatch rafters to eave and midway purlins and to thatch ridgepole, and of the end thatch rafters to the side thatch rafters is by a continuous cord of three-ply braided sennit, ⅛ inch thick, which takes two transverse turns around the two crossing elements, then makes a single circumferential turn around the transverse turns between the two elements, and passes to the next crossing elements. All other lashing is the typical Pukapukan alternating curves pattern lashing with three-ply braided sennit, ¼ to ⅜ inch thick.

The thatching of this house is with coconut roof sheets, the method being that described for the *wale wahoyamea* house.

The floor is covered with coral gravel which is retained by lengths of timber laid on the ground on the inside of the wall posts.

Principal measurements of this *wale aiaa* type watch house are: length, 34 feet; width, 14 feet; height of wall posts from the ground, 4 feet 10 inches; height of eaves from the ground, 3 feet 10 inches; height of ridgepost, 10 feet 2 inches; diameter of ridgepost, 5 to 6 inches; diameter of wall posts, 9 inches; diameter of tiebeams, 6 inches; diameter of principal rafters, 4 inches.

## Variations

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The construction of the sleep house on the outer beach of Uta and that of the model house in Bishop Museum are identical with the basic structure of the watch house first described, except for the following variations:

Sleep house. This house has four ridgeposts, grooved to hold the ridgepole. There are four wall posts on either side of the house, grooved to receive the wall plate. Four tiebeams are placed on these wall plates, their ends flush with the wall plates. Rafters cross above ridgepole to take thatch ridgepole, and are flush at their lower ends with the wall plates. There are no purlins or thatch rafters, roof sheets of coconut being fastened directly to the rafters. Along the windward side and west end of the house, there are subsidiary wall posts, each 2 feet apart, which are lashed at their upper end to the wall plate or end plate. The thatching from the roof or end is continued to the ground on these sides, the coconut roof sheets being applied directly to the subsidiary wall posts to form a permanent wall. At the east end of the house, the end rafters run out at an angle of 60 degrees from the side rafters, and are supported at their lower end by six low end posts, each 20 inches high, and an end wall plate. The east end thatching continues to the ground, and the end thatching is tied directly to the end wall posts. The whole of the south (leeward) side of the house is permanently open. This house is 24 feet long and 10 feet wide; the ridgepost is 6 feet high, and the eaves on the south side are 3 feet from the ground. The house is low, strong, and compact, well

1:Beaglehole and Beaglehole E-5 (1934-5)1938 Pukapukans



[342] adapted to withstand the fierce gales from the northwest that strike this exposed beach with full force.

341 335 Model house combining features from both the *wale nukuyanoa* and the *wale atua* types. This house has five wall posts on either side, two wall plates, and six tiebeams, which project beyond the end of the wall plates and support two roof plates. There are four ridgepoels, one on the inside of each of the end tiebeams and one on the outer sides of the third and fourth tiebeams. Eight principal rafters on each side run from the roof plates and cross above the main ridgepole to support a rafter ridgepole (*tau lua*). There are two purlins on either side, an eaves purlin and a midway purlin. The midway purlin on one side is narrower than that on the other side. In order to keep the thatch rafters on both sides equidistant from the principal rafters, the narrower purlin is given additional width by chocks (*neinei*) inserted between purlin and rafters. Thatch rafters run on the outside of the purlins. At the top, they support on the under side a third ridgepole (or a thatch rafter ridgepole), *tautolu*, which is separated from the rafter ridgepole by chocks (*neinei*) but is lashed to the thatch rafters. On top of the crossed thatch rafters is laid a fourth ridgepole (or thatch ridgepole), *tolu uomoli* (fig.11,*b*). At the bottom, the thatch rafters support a thatch eaves purlin.

At each gable end, end wall plates (or additional tiebeams) are lashed at each end to the ends of the side wall plates. The principal end rafters are fastened at the top to the second side rafters, all save the outer end rafter which is fastened to the main ridgepole between the second and third side rafters. At their lower ends, the end rafters are lashed to the end wall plate, but project downward and beyond this to support an end eaves purlin, which is itself fastened at each end to the side eaves purlins. The end wall plates are braced by two struts (yoke) which are lashed to the two outer tiebeams and project far enough to be lashed to the end wall plates. The end thatch rafters run on the outside of the end eaves purlins to the first rafter on either side. On the bottom outside of the end thatch rafters is lashed a thatch rafter eaves purlin, which is itself joined at each end to the side thatch rafter eaves purlins. The ridgepole is further strengthened by two diagonal braces (yoke), each brace running from the middle of the third tiebeam (counting from each end) to the main ridgepole, and lashed to both tiebeam and ridgepole.

341 335 284 The lashings of this house conform to Pukapukan pattern. The central principal rafters and the diagonal braces, which both lie against the main ridgepole obliquely, are lashed to the ridgepole by four transverse turns which are themselves tightened by three circumferential turns (*sinnet nukupoko*). The first and second ridgepoles and again the third and fourth ridgepoles are bound against each other by five transverse turns of sennit which are made taut by three or four circumferential turns, thus forming a suspended loop lashing (*sinnet nukuanoa*; fig.10,*b*).

341 335 The variations in this model *wale atua* type house bring it close in type to the *nukuyanoa* house, the only distinction being the use of ridgepoels in the model and the heavier construction of the roof framework. It was suggested by informants that the reason for projecting the tiebeams beyond the level of the wall plates, and then adding —of necessity—roof plates to support the principal rafters, is to protect wall posts of pandanus from exposure to the weather. By projecting the tiebeams a sufficient distance (from 12 to 18 inches), low eaves would give ample protection to the wall posts, especially if thin poles are run between the ends of the tiebeams and the ground to support wall sheets. If these poles rot, they can be replaced easily, but it is difficult to replace main wall posts without pulling down and rebuilding the roof framework.

## House Furnishings

352 513 Furnishings of the Pukapukan house are of the simplest kind. People sleep on cocoanut leaf and pandanus sleeping mats laid on the coral pebble floor or on wooden platforms. When not in use, mats are rolled (*tapuka*)

2: Macgregor E-2 (1933) 1935 Pukapukans
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[Information in this source which is either inadequate, incorrect or duplication has only been filed in category 116: for description of houses and their construction, see pp. 43-45.]